



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CUPRIC SULFATE**

CAS Number: 7758-98-7

DOT Number: NA 9109

RTK Substance number: 0549

Date: January 1986 Revision: January 1999

HAZARD SUMMARY

- * **Cupric Sulfate** can affect you when breathed in and by passing through your skin.
- * **Cupric Sulfate** is a TERATOGEN--HANDLE WITH EXTREME CAUTION.
- * **Cupric Sulfate** can cause reproductive damage.
- * Because this is a MUTAGEN, handle it as a possible carcinogen--WITH EXTREME CAUTION.
- * Contact can cause severe skin irritation and burns. Repeated contact may cause thickening of the skin.
- * **Cupric Sulfate** can cause severe eye irritation and burns leading to permanent damage.
- * Breathing **Cupric Sulfate** can irritate the nose, throat and lungs, causing coughing and wheezing. Repeated exposure can cause shrinking of the lining of the inner nose.
- * Exposure to fumes from heated **Cupric Sulfate** may cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough.
- * **Cupric Sulfate** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- * Repeated exposure to **Cupric Sulfate** can damage the liver.

IDENTIFICATION

Cupric Sulfate is a blue crystalline (sand-like) or granular powder. It is used as a wood preservative, pigment, an antifungal, and in animal feed and fertilizer.

REASON FOR CITATION

- * **Cupric Sulfate** is on the Hazardous Substance List because it is regulated by OSHA and cited by NIOSH, ACGIH, DOT, DEP and EPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for *Copper*:

- OSHA: The legal airborne permissible exposure limit (PEL) is **1 mg/m³** for *Copper dusts and mists* and **0.1 mg/m³** for *Copper fume* averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **1 mg/m³** for *Copper dusts and mists* and **0.1 mg/m³** for *Copper fume* averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **1 mg/m³** for *Copper dusts and mists* and **0.2 mg/m³** for *Copper fume* averaged over an 8-hour workshift.

- * **Cupric Sulfate** may cause mutations. All contact with this chemical should be reduced to the lowest possible level.
- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Cupric Sulfate** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Cupric Sulfate** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in “hot” operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Cupric Sulfate**:

- * Contact can cause severe skin irritation and burns. Repeated contact may cause thickening of the skin.
- * **Cupric Sulfate** can cause severe eye irritation and burns leading to permanent damage.
- * Breathing **Cupric Sulfate** can irritate the nose, throat and lungs, causing coughing and wheezing.
- * Exposure to fumes from heated **Cupric Sulfate** may cause “metal fume fever.” This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Cupric Sulfate** and can last for months or years:

Cancer Hazard

- * **Cupric Sulfate** may cause mutations (genetic changes). Whether or not it poses a cancer hazard needs further study.

Reproductive Hazard

- * **Cupric Sulfate** may damage the testes (male reproductive glands).
- * **Cupric Sulfate** may decrease fertility in males and females.

Other Long-Term Effects

- * Repeated exposure can cause a shrinking of the lining of the inner nose, with a watery discharge, and/or thickening of the skin.
- * **Cupric Sulfate** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- * Repeated exposure to **Cupric Sulfate** can damage the liver. It can also cause *Copper* to deposit in skin and hair, leaving a green color.

MEDICAL

Medical Testing

For those with frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- * Serum and urine *Copper* levels.

If symptoms develop or overexposure is suspected, the following is recommended:

- * Liver function tests.
- * Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

- * Because more than light alcohol consumption may cause liver damage, drinking alcohol may increase the liver damage caused by **Cupric Sulfate**.

Conditions Made Worse by Exposure

- * “Wilson’s Disease” is a rare condition that interferes with the body’s ability to get rid of *Copper*. If you have this illness, consult your doctor about *Copper* exposure.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer **Cupric Sulfate** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Cupric Sulfate** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Cupric Sulfate**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Cupric Sulfate**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Cupric Sulfate**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Cupric Sulfate** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- * Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Cupric Sulfate**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear impact resistant eye protection with side shields or goggles.
- * Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- * Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
- * NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.

- * If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Cupric Sulfate**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- * Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- * Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- * Exposure to **100 mg/m³** (as *Copper*) is immediately dangerous to life and health. If the possibility of exposure above **100 mg/m³** (as *Copper*) exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
- A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.
- Q: Who is at the greatest risk from reproductive hazards?
- A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.
- Q: What are the likely health problems from chemicals which cause mutations?
- A: There are two primary health concerns associated with mutagens: (1) cancers can result from changes induced in cells and, (2) adverse reproductive and developmental outcomes can result from damage to the egg and sperm cells.

=====

The New Jersey Department of Health and Senior Services, Occupational Disease and Injury Services, offers multiple services in occupational health. These include: Right to Know Information Resources, Public Presentations, General References, Industrial Hygiene Information, Surveys and Investigations, and Medical Evaluation. Consult another Fact Sheet for a more detailed description of these services or call (609) 984-2202.

=====

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

HANDLING AND STORAGE

- * Prior to working with **Cupric Sulfate** you should be trained on its proper handling and storage.
- * **Cupric Sulfate** may form explosive materials on contact with ACETYLENE and NITROMETHANE.
- * **Cupric Sulfate** is not compatible with SODIUM HYPOBROMITE; HYDRAZINE; STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); MAGNESIUM; HYDROXYLAMINE; and ZIRCONIUM.
- * Store in tightly closed containers in a cool, well-ventilated area

FIRST AID

In N.J. POISON INFORMATION 1-800-764-7661

- ## Eye Contact

- * Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

- * Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of water.

Breathing

- * Remove the person from exposure.
- * Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- * Transfer promptly to a medical facility.

PHYSICAL DATA

Water Solubility: Soluble

OTHER COMMONLY USED NAMES

Chemical Name:

Sulfuric Acid, Copper (2+) Salt (1:1)

Other Names:

Blue Copper; Blue Vitriol; Copper Sulfate

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES

Right to Know Program

PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202